

**DEVELOPMENT OF CELL CULTURES FROM
CITRUS GRANDIS FLOWERS AND PRODUCTION
OF FRAGRANCE COMPOUNDS
IN THE CULTURES**



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Perkara di atas adalah dengan segala hormatnya dirujuk.

Sukacita dimaklumkan bahawa penyelidikan yang bertajuk di atas telah berjaya dijalankan dan bersama-sama ini disertakan dua (2) naskhah laporan akhir dan satu (1) *softcopy* (CD) bagi tujuan rujukan.

Sekian, terima kasih.

Wassalam.

Yang benar,



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ABSTRACT

Citrus grandis flowers possesses a strong floral-, jasmine- and orange- like aroma that has a potential in perfumery industries. Three extraction techniques that is hydrodistillation, Soxhlet extraction and solid phase micro extraction (SPME) were coupling with gas chromatograph–mass spectrometry (GC-MS) for analysis of fragrance compounds from this flowers. About 120 compounds were detected in bud and blossom of these flowers, of which the five major fragrance compounds were β -myrcene, limonene, ocimene, linalool and caryophyllene. In hydrodistillation, ocimene and linalool detected in blossom were higher than in bud with 4.57%. However, Soxhlet extraction showed that bud contained high percent of limonene (27.25%), ocimene (5.55%) and linalool (2.97%) compared to blossom. Three different SPME fibers were used in this study, namely, 65 μ m CAR/PDMS, 75 μ m PDMS/DVB and 100 μ m PDMS. The best result was obtained by 100 μ m PDMS, that were then further analyzed for optimum sampling time. It showed 60 min fiber exposition time was the optimum sampling time to extract the major fragrance compounds from the headspace. In cell culture development, callus was successfully induced from different part of *C. grandis* flowers like petal, sepal, style, ovary, pistil and cup base on Murashige and Skoog (MS) medium supplemented with sucrose (30 g/l) and various concentrations of hormones. It was found that different parts of flowers required different level of hormone for callus induction. The highest formation of callus were obtained from petal and sepal cultured on MS media supplemented with 1.5 mg/l kinetin. For the style and pistil, 50% of the explants had developed callus when cultured on MS media added with 0.05 mg/l and 0.10 mg/l BAP respectively. On the other hand, sucrose agar media alone managed to induce callus formation from the cup base and ovary with success rate between 11 ± 1.29 to $25 \pm 4.19\%$. Callus obtained were then subjected to SPME for determination of compounds in the callus. Seven compounds were detected in the callus which some of the compounds shows the same compounds as detected in the fresh flowers.